

### REMARKS/ARGUMENTS

Reconsideration of the present application, as amended, is respectfully requested.

A. Status of the Claims

As a result of the present amendment, claims 1-30 are presented for continued prosecution.

B. Claim Objection and Amendments

The Examiner objected to claims 5, 10 and 18 for failing to limit the subject matter of the previous claims.

Applicant has amended claim 5 to be dependent on claim 3. Claim 10 has been amended to delete "with an acid number of less than about 200" which appears in base claim 1. Claim 18 has been amended to recite that the pore size is about 4 to about 5 Angstroms. Applicant respectfully submits that the amended claims are acceptable.

C. The Invention

The present invention, as defined by the amended claims, includes a zeolite-containing dispersion, a method of applying an anti-microbial treatment to a packaging material, a packaging material with anti-microbial properties, and a method of rendering a substrate anti-microbial or more resistant to bacteria.

In one of the novel aspects of the invention, the zeolite-containing dispersion is printed onto of the surface of a packaging material. The dispersion includes a polymer having an acid number of less than about 200. Applicant has discovered that the dispersions of the present invention having an acid number of less than about 200 efficiently deliver an effective amount of the anti-microbial zeolite to a surface of the material compared to prior art compositions and techniques (see paragraph 11 and 7 of the present application). Also, Applicant has discovered that the dispersions of the present invention overcome drawbacks associated with conventional techniques where the compositions are extruded or molded into the material which causes the anti-microbial agent to be buried within the material and reduces the effectiveness of the agent.

D. Rejection to Independent Claims 1, 19, 28 and 9

Claims 1, 2, 7-12, 16-19, 21-23, and 27-30 have been rejected as being unpatentable over Niira (U.S. 4,938,958).

Niira had been cited to teach an anti-microbial zeolite and resin composition prepared by either incorporating the zeolite into the resin or providing the zeolite on the surface of the resin.

In order to maintain an obviousness rejection under 35 U.S.C. § 103(a), the differences between the claimed invention and the prior art must be obvious to a person of ordinary skill in the art at the time the claimed invention was made. Applicant respectfully submits that the claimed invention is not obvious based on the teachings of Niira for at least the following reasons.

1. Niira does not teach or suggest a dispersion having a polymer with an acid number of less than about 200

Claim 1 recites a zeolite-containing dispersion having a polymer with an acid number of less than about 200. As explained, for example, in paragraph 11 of the present application, Applicant has discovered that combinations of polymers and zeolites do not always produce stable compositions. For instance, many compositions include polymers having acid numbers greater than about 200, and Applicant has found that such compositions are unstable because the viscosity of the composition increases to a point where the composition cannot be printed as a dispersion. The dispersions of the claimed invention overcome the drawbacks associated with the prior art compositions in part due to the fact that the dispersions include a polymer having an acid number less than about 200.

Claim 1 highlights this aspect of the present invention as it recites a dispersion including a polymer having an acid number of less than about 200. The significance of the acid number limitation is demonstrated in the Examples of the present application. As shown in Comparative Example 5 beginning on page 17, the use of Joncryl 678 resin (acid number 215), Joncryl DFC-3015 resin (acid number 240) and Joncryl DFC-3025 resin (acid number 220) produced unstable compositions with high viscosity. Similarly, the composition of Comparative Example 6 employing resins with acid numbers greater than about 200 had an increased viscosity and could not be used for print coatings.

As explained in paragraph 67 of the application, Applicant believes that the compositions of Comparative Examples 5 and 6 are viscous because the resins have an acid number above about 200. It was additionally noted in paragraph 67 that dispersions incorporating low acid number polymers as recited in claim 1 did not exhibit the drawbacks of Comparative Examples 5 and 6.

The Examiner recognized that Niira teaches incorporating/kneading a zeolite into a resin or coating the zeolite onto the surface of the resin (see column 4, lines 34-39 of Niira). Applicant respectfully submits that this section of Niira does not teach or suggest the dispersion claim 1.

The incorporating/kneading step and the coating step in column 4 of Niira do not produce a dispersion. The dispersions of the claimed invention are water or solvent-based compositions (see paragraph 13 of the application). Niira does not teach or suggest a water or solvent-based composition. In contrast, Niira teaches solid compositions wherein the zeolite is kneaded into the resin or coated onto the resin. Niira therefore does not teach or suggest the dispersion recited in claim 1.

Moreover, the composition of claim 1 is in the form of a dispersion in part due to the fact that the composition includes a polymer having an acid number less than about 200. As described above with regard to Comparative Example 5 and Comparative Example 6 of the present application, compositions with polymers having acid numbers greater than about 200 are viscous and not in the form of stable dispersions. Niira does not teach or suggest that his compositions include polymers with acid numbers less than about 200. Actually, Niira is completely silent with respect to the acid numbers of his polymers. Niira therefore does not teach or suggest that a composition including a polymer with an acid number less than about 200 forms a stable dispersion, and that such a dispersion can be satisfactorily printed onto the surface of a material as disclosed in the present application.

Applicant respectfully submits that those skilled in the art would not find claim 1 obvious, because Niira does not teach or suggest a composition including a polymer with an acid number less than about 200, and that such a composition is in the form of a dispersion which can be satisfactorily applied to a material.

2. Niira does not teach or suggest printing the dispersion of claim 1 onto a surface of a packaging material

Method claim 19 recites printing the dispersion of claim 1 onto a surface of a packaging material. Similarly, claim 28 recites a packaging material made by printing the dispersion of claim 1 onto a surface of the packaging material. Thus, claims 19 and 28 both recite that the dispersion is printed.

As explained in section 1 above, Niira does not teach or suggest the dispersion of claim 1 having a polymer with an acid number of less than about 200. Consequently, Niira cannot teach or suggest the methods of claims 19, 28 and 29 which include the limitations of the dispersion of claim 1. Applicant therefore respectfully submits that claims 19, 28 and 29 are patentable over the teachings of Niira.

In addition, claims 19 and 28 recite that the dispersion is printed onto a surface of a packaging material. The significance of printing the dispersions of the present invention is described, for example, in paragraph 11 of the application. As described therein, many zeolite compositions cannot be satisfactorily printed, because some compositions include polymers having acid numbers greater than about 200. Such compositions do not form stable dispersions. Applicant has discovered that this problem can be overcome by printing a composition having a polymer with an acid number of less than about 200. Such a composition is in the form of a stable dispersion.

Suitable printing methods for use in the present invention include, for example, rotogravure, flexography, screen, pad, and others described in paragraph 45 of the application. In part due to the dispersion of the claimed invention having a polymer with an acid number of less than about 200, the dispersion can be efficiently printed on a surface of a material compared to prior art methods where the composition is extruded or molded into the material. With such extrusion and molding techniques, the zeolites are forced below the surface of the material and are consequently less available for anti-microbial protection (see paragraph 17 of the application).

Niira does not teach or suggest the printing step of claim 19, which can be rotogravure printing, flexographic printing, etc. Instead, Niira teaches mixing the zeolite with paint (column 4, lines 58-59), coating the zeolite on a film (column 4, lines 63-64), admixing the zeolite with construction materials (column 5, lines 1-2), applying the zeolite to a surface of the construction

material (column 5, lines 2-3), incorporating the zeolite into paper (column 5, lines 4-6), and coating the zeolite on the paper (column 5, lines 9-10). In sum, Niira teaches that the zeolite is either mixed with a material or coated on the material.

The mixing process of Niira is similar to the conventional processes described in paragraph 5 of the present application which incorporate the agent into the raw material. As described therein, the anti-microbial agent becomes "buried" within the material. In contrast to the claimed printing step, burying the agent in the raw material is undesirable because the anti-microbial properties of the agent are minimized.

Similarly, the composition of Example 5 in col. 9 of Niira is injection-molded into the product. Paragraph 5 of the present application also describes that injection-molding is undesirable because the agent is buried into the material. Thus, the mixing process and the injection-molding process of Niira are not the claimed printing step.

With regard to the coating process of Niira, Niira provides absolutely no teaching or suggestion concerning how to coat the material. Put another way, Niira does not lead those in the art to any of the dozens of known coating methods. Presumably, since the compositions of Niira are not stable dispersions as explained above, the compositions cannot be printed using the techniques of the present invention. It is therefore respectfully submitted that Niira does not teach or suggest printing a dispersion as recited in claims 19 and 28, and that it would not be obvious to print a dispersion based on the teachings of Niira because the compositions of Niira are not described as being stable dispersions. In addition, since Niira does not teach or suggest a stable dispersion, it is believed that Niira does not teach or suggest applying a dispersion as recited in claim 29.

Applicant respectfully submits that claims 19, 28 and 29 are not obvious based on the teachings of Niira, because Niira does not teach or suggest to those in the art printing or applying a dispersion to a material.

E. Rejections based on the combinations of Niira '958, Niira '699, Neumann and Lindgren

Claims 3-6, 14, 15 and 24-26 had been rejected as being unpatentable over Niira '958 in view of Niira '699 (U.S. 5,556,699). Claim 13 had been rejected as being unpatentable over Niira '959 in view of Neumann (U.S. 4,322,929). Claim 20 had been rejected as being unpatentable over Niira '958 in view of Lindgren (U.S. 5,603,997).

Claims 3-6, 13-15, 20 and 24-26 ultimately depend on independent claims 1 and 19. For the reasons set forth above, it is believed that claims 1 and 19 are patentable over the teachings of Niira '958. It is therefore believed that dependent claims 3-6, 13-15, 20 and 24-26 are patentable as well.

F. Fees

This Response is being filed within the shortened statutory period for reply. No fee is believed to be due. If, on the other hand, it is determined that fees are due or any overpayment has been made, the Assistant Commissioner is hereby authorized to debit or credit such sum to Deposit Account No. 02-2275. Pursuant to 37 C.F.R. 1.136(a)(3), please treat this and any concurrent or future reply in this application that requires a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. The fee associated therewith is to be charged to Deposit Account No. 02-2275.

G. Conclusion


In view of the actions taken and arguments presented, it is respectfully submitted that each and every one of the matters raised by the Examiner has been addressed by the present amendment and that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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